

Review: Past–Present–Future: The ETH Zurich

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David Gugerli, Patrick Kupper, and Daniel Speich, *Die Zukunftsmaschine: Konjunkturen der ETH Zürich, 1855–2005* (Zürich: Chronos, 2005), 524 pp., ISBN 3-0340-0732-9.

Jürg Dual and Nicole Schwyzer (eds.), *Essays 2030: Visionen für die Zukunft der ETH Zürich* (Zürich: Verlag Neuer Zürcher Zeitung, 2005), 202 pp., ISBN 3-03823-161-4.

The French writer and technology enthusiast Antoine de Saint Exupéry once exclaimed: ‘Instead of trying to foresee the future, we should rather see to it that we make it happen.’ Indeed, when we look back at the past 150 years and the ways in which scientists and engineers have made the future happen, this seems to be advice well taken. In many respects, the enormous changes brought to fruition through science and technology have probably had a much deeper impact on our daily lives than most other social, cultural, or political events.

At the forefront of these changes have been technical universities such as MIT,¹ CalTech, Imperial College London, RWTH Aachen, the Technical University at Karlsruhe, and the ETH Zürich (the Swiss Federal Institute of Technology). These are not only the incubators of new ideas and services, and hosts to an impressive array of researchers, but also the training grounds for the next generation of leaders in research and technological development. Their threefold mission makes them crucial to a sustainable future.

As contrasted with Europe’s universities and academies, the polytechnics and technical universities have a relatively short history, mostly dating from the 19th century. This was the case with the Eidgenössische Technische Hochschule (ETH)

¹ For MIT, see Kargon (2006, pp. 468–471).

Zürich, which was set up in 1855 as a school for technicians and engineers. On the occasion of its 150th anniversary, it has seized the opportunity to take stock, and to invite researchers and administrators to predict the future of the Institute and the world of science and technology between now and its 175th anniversary in 2030.

Not only in scope and size, but also in the gravity of its approach, the volume by David Gugerli, Patrick Kupper, and Daniel Speich clearly outweighs the collection of essays by Dual and Schwyzer. Gugerli and colleagues have succeeded in avoiding the usual complimentary *Festschrift*—much useful documentation is presented at www.ethistory.ethz.ch—and have done more than give a mere chronicle of events, by weighing the ETH's struggles and its ultimate success as an engine of change.

In 1851, when the Swiss Federal Council outlined plans to establish a national school of technology, or 'Polytechnikum', it emphasized the role such an institute would play in the future of Swiss society ('*Trägerin der vaterländischen Zukunft*') and in determining its economic success. At the time, there was a widespread feeling that Switzerland needed to catch up with its industrial neighbours. The polytechnique became one of the building blocks of the new federal state, and although it did not contribute directly to creating a political elite, it became enormously important in producing the elites that ran the Swiss industrial and service sectors as well as its public administration.

In their attempt to capture the emerging role of the ETH, Gugerli and his colleagues have coined the term *Zukunftsmaschine*, a metaphor that embraces the institute's function as a producer and distributor of knowledge and expertise, and reminds us that a machine develops its own logic and dynamic. In the course of its history, the ETH became both an agent of rapid modernization and a pivotal laboratory for Switzerland's social, economic and, more recently, its ecological development as well.

Gugerli's colleagues offer a rich bouquet of insights into ETH's institutional development. It may suffice to illustrate their approach and principal conclusions:

- The ETH, today one of the leading research universities in the world, began as a teaching institution. Laboratories were added in the 1880s, and the right to grant doctoral degrees was awarded in 1908, just 3 years before the polytechnique was renamed the Eidgenössische Technische Hochschule.
- Following the First World War, cooperation between the ETH and Swiss industry intensified to include jointly financed institutes and strategic alliances. These made the ETH a cornerstone of Swiss cultural and economic strategy ('*geistige Landesverteidigung*'), and contributed to the Swiss nationalisation of the professoriate and the student body.
- When it became clear during the 1960s that the strategy of embedding the ETH in its local environment was no longer viable, the institute entered a phase of experimentation. Torn between traditional approaches and changing demands, the ETH underwent a transformation, later characterized by its President, Heinrich Ursprung, as 'reform in a straightjacket' ('*Reform in der Zwangsjacke*')—pinpointing the limited scope for change in the face of numerous legal and institutional restrictions.

- Perhaps the managers of the ETH placed too much emphasis on plans and projects that were speculative. This may have been true for some of its more ambitious projects, but there can be no doubt that structural and academic reforms during the second half of the 1970s and in the 1980s—with new departments and internationalised recruitment strategies—turned the ETH into a world class institution.
- Today, internationality and interdisciplinarity have become hallmarks of teaching and research at the ETH. Transdisciplinary doctorates and cross-cutting research in systems biology, nanotechnology, and material science demonstrate that the boundaries between disciplines as well as between science and engineering are shrinking. This has involved a thorough rethinking of undergraduate education and doctoral training, as well as the establishment of new institutional spaces—such as the centre for advanced studies (Collegium Helveticum), established in 1996, which has since presented many intellectual opportunities to students and researchers.

There can be no doubt that the ETH is well-placed to meet the challenges of the 21st century. And yet, if it wants to remain what Olaf Kübler calls a ‘growth engine’, and retain its leadership role, it will have to analyse, rethink and reconfigure its policies, structures, and practices. It must keep its windows to the world wide open, and provide a platform for the exchange of ideas.

This was the rationale behind the collection of essays prepared by Jürg Dual and Nicole Schwyzer, which entailed a highly original competition among students and staff. Asked to present their vision of the Institute 25 years hence, they not surprisingly produced a wide spectrum of reflections and requirements. Again a few examples will suffice:

- An interesting essay by Nobel Prize winner Werner Arber argues for the need to strike a balance between disciplinary specialisation and transdisciplinary competence in training the next generation.
- An impressive call by Arber’s Nobel Prize colleague, Richard R. Ernst, for ETH to change its priorities to confront the needs of a socially and environmentally sustainable world.
- A forecast by the well-known economist Bruno S. Frey, which foresees an end to the university as we know it, and the rise of autonomous research teams, linked to various institutions, creating a vibrant and to a large extent virtual network that no longer needs a central administration.
- An appeal from the anthropologist Christoph Meier to turn the institute into a ‘slow breeder’ of original approaches and ideas, rather than a place that fosters ever more efficient strategies for publication; and a call from philosopher Georg Kohler for a renewed emphasis on ‘curiosity’ to replace current demands for ‘relevance’.

A range of essays by comparative ‘outsiders’, such as the former EU Commissioner Philippe Busquin; the President of the Max Planck Society, Peter Gruss; the President of the Tongji University, Quidi Wu; and the President of Darmstadt Technical University, Johann Dietrich Wörner—almost inevitably touch

on wider trends in higher education. These include the growing interest in internationalisation and strategic alliances (Qidi Wu), the role awaiting the ETH in a future 'Europe of knowledge' (Philippe Busquin), and the increasing dominance of the life sciences (Peter Gruss). Johann Dietrich Wörner's vision of the ETH in 2030 as a private university, with an endowment of €20 billion, delivers a visionary birthday present, which the ETH might one day look back upon as not just another piece of wishful thinking.

All in all, both volumes provide a rich and intellectually stimulating portfolio of observations. By putting scientific and technological progress in perspective, they open up debates not only on the future of ETH, but also on our common future, which the institute will surely help shape.

Reference

Kargon, Robert. 2006. Why MIT's History Matters. Review of *Mind and Hand: The Birth of MIT*, by Julius A. Stratton and Loretta H. Mannix. *Minerva Book Review* 44 (4): 468–471.

Author Biography

Wilhelm Krull is Director of the VolkswagenStiftung. He is a member of many governing boards and advisory committees, and has published extensively on higher education and research policy.